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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/092,526	03/08/2002	Hisao Shigematsu	981380A	4590
23850	7590	10/24/2003	EXAMINER	
ARMSTRONG, KRATZ, QUINTOS, HANSON & BROOKS, LLP 1725 K STREET, NW SUITE 1000 WASHINGTON, DC 20006			BROCK II, PAUL E	
			ART UNIT	PAPER NUMBER
			2815	

DATE MAILED: 10/24/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/092,526

Applicant(s)

SHIGEMATSU ET AL.

Examiner

Paul E Brock II

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 13-26 is/are pending in the application.
- 4a) Of the above claim(s) 14, 16, 18, 19, 22-24 and 26 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 13, 15, 17, 20, 21 and 25 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 March 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☒ Certified copies of the priority documents have been received in Application No. 09/191,543.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: .

DETAILED ACTION

Election/Restrictions

1. Applicant's election of Species I, claims 13, 15, 17, 20, 21, and 25 in Paper No. 6 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).
2. Claims 14, 16, 18, 19, 22 – 24, and 26 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim. Election was made **without** traverse in Paper No. 6.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 13, 15, 17, and 21 are rejected under 35 U.S.C. 102(e) as being anticipated by Shimawaki (USPAT 5903018).

With regard to claim 13, Shimawaki discloses in figures 3 – 7 a method for fabricating a semiconductor device. Shimawaki discloses in figure 3 forming a first semiconductor layer (4) on a semiconductor substrate. Shimawaki discloses in figure 3 and column 5, lines 29 – 55 and column 7, lines 54 – 60 forming a base layer (5) of a carbon doped $\text{Ga}_x\text{In}_{1-x}\text{As}_y\text{Sb}_{1-y}$ layer on the first semiconductor layer. Shimawaki discloses in figure 3 forming a second semiconductor layer (7) on the base layer. Shimawaki discloses in figure 4 patterning the second semiconductor layer in a mesa shape. Shimawaki discloses in figure 6 and column 6, lines 40 – 55 forming a base contact layer (12) on the base layer exposed by patterning the second semiconductor layer. Shimawaki discloses in figure 6 forming a base electrode 14 on the base contact layer.

With regard to claim 15, Shimawaki discloses in figure 3 and column 6, lines 5 – 6 wherein in the step of forming the base layer, the base layer of an InGaAs layer which corresponds to the $\text{Ga}_x\text{In}_{1-x}\text{As}_y\text{Sb}_{1-y}$ layer whose As composition y is 1.

With regard to claim 17, Shimawaki discloses in figure 6 and column 6, lines 40 – 55 wherein in the step of forming the base contact layer, the base contact layer is formed of a material which lattice matches with a material forming the base layer. It should be noted that lattice matching results from the MOMBE (metal organic molecular beam epitaxy) process used to form the base contact layer.

With regard to claim 21, Shimawaki discloses in figure 5 after the step of patterning the second semiconductor layer, a step of forming a sidewall insulation film (18) on a sidewall of a mesa of the second semiconductor layer.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shimawaki as applied to claim 13 above, and further in view of Hashimoto et al. (USPAT 5846869, Hashimoto).

Shimawaki discloses in figure 6 and column 6, lines 50 – 51 heating during the step of forming a base contact layer. Shimawaki is silent to, before the step of forming the base contact layer, a step of thermal treating for eliminating hydrogen in the base layer. Hashimoto teaches in figures 18 – 20 and column 11, line 56 – column 12, line 31, before the step of forming a layer overlying a base layer, a step of thermal treating for eliminating hydrogen in the base layer. It would have been obvious to one of ordinary skill in the art at the time of the present invention to use the thermal treating of Hashimoto before the step of forming the base contact layer in the method of Shimawaki in order to improve the amplification factor of the bipolar transistor as stated by Hashimoto in column 11, line 56 – column 12, line 31.

7. Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shimawaki as applied to claim 13 above, and further in view of Frank et al. (USPAT 4821082, Frank).

Shimawaki discloses in figure 7 and column 5, lines 29 – 55 wherein the second semiconductor layer is an emitter layer of an AlGaAs layer. Shimawaki does not teach that the

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emitter layer is of an InP layer. Frank discloses in column 5, lines 51 – 63 an emitter layer of an InP layer. It would have been obvious to one of ordinary skill in the art at the time of the present invention to use the InP emitter layer of Frank as the second semiconductor layer in the method of Shimawaki in order to improve transistor characteristics by increasing the electron mobility when compared with an AlGaAs emitter layer as taught by Frank in column 5, lines 51 – 63.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Mochizuki et al., Hirata et al., Hafizi et al., and McDermott all disclose forming bipolar transistors.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Paul E Brock II whose telephone number is (703) 308-6236. The examiner can normally be reached on 8:30 AM - 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (703) 308-2772. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Paul E Brock II

